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ABSTRACT

The purpose of this study was to investigate the effect of cooperative learning and type of reward on performance and continuing motivation. Subjects used either a cooperative or individual learning strategy while receiving information, examples, practice, and feedback from an instructional television lesson. Subjects (126 undergraduate education majors) were also provided with one of the three rewards (i.e., task, performance, none). Results indicated that subjects who worked alone performed better on the posttest and expressed more continuing motivation than those who worked cooperatively. Type of reward did not affect performance or continuing motivation. Implications for reemploying cooperative groups in settings that were originally designed for individual learning are provided. Two tables containing performance and motivation test score data are appended. (Contains 18 references.) (Author/KRN)

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ED 362 175

Title:

Effects of Cooperative Learning and Type of Reward on Performance and Continuing Motivation

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Abstract

The purpose of this study was to investigate the effect of cooperative learning and type of reward on performance and continuing motivation. Subjects used either a cooperative or individual learning strategy while receiving information, examples, practice, and feedback from an instructional television lesson. Subjects were also provided with one of three rewards (i.e.: task, performance, none). Results indicated that subjects who worked alone performed better on the posttest and expressed more continuing motivation than those who worked cooperatively. Type of reward did not affect performance or continuing motivation. Implications for employing cooperative groups in settings that were originally designed for individual learning are provided.

Effects of Cooperative Learning and Type of Reward on Performance and Continuing Motivation

A number of studies have been conducted to compare cooperative and individual learning strategies. According to Johnson & Johnson (1989), a cooperative learning strategy allows students to work together to increase performance and achieve shared goals; an individual learning strategy requires students to work by themselves to accomplish their own goals. Several reviews of research suggest that cooperative learning affects student performance, productivity, transfer of learning, time on task, and attitude (Johnson & Johnson, 1989; Rysavy & Sales, 1991; Sharan, 1980; Slavin, 1990).

The results of cooperative learning research has inspired instructional technologists to examine how cooperative groups can be implemented with media originally designed for individual learning. Results of studies conducted to investigate cooperative learning and computer-assisted instruction are mixed. Some researchers report that cooperative learning positively affected performance in CAI lessons (Dalton, Hannafin, & Hooper, 1989; Johnson, Johnson, & Stanne, 1985), while others have not found a significant effect for performance when learners used cooperative CAI (Carrier & Sales, 1987). Research on cooperative learning and instructional television suggests that students working in groups are more motivated than those who work alone, but performance in these settings is influenced by one's affiliation motives (Klein & Pridemore, 1992).

The mixed results in studies that have examined cooperative learning with media may be due to the rewards provided to students. Some scholars indicate that providing rewards to students who work in cooperative groups can negatively impact their achievement, interest, and continuing motivation (Kohn, 1991). However, many researchers suggest that providing rewards to students is an important component in cooperative learning (Johnson & Johnson, 1989; Sharan, 1980; Slavin; 1990).

Researchers have distinguished between cooperative and individualistic reward structures (Deutsch, 1949; Johnson & Johnson, 1974; Michaels, 1977; Slavin, 1977). A cooperative reward structure provides all members of a group the same reward based on the performance of the whole group. An individualistic reward structure provides each individual with a reward based on their own performance.

In cooperative learning settings, the effect of these types of rewards on performance is unclear. Slavin (1991), suggests ". . . almost every study of cooperative learning in which the cooperative classes achieved more than the traditional control groups used some sort of group reward" (p. 89). However, other researchers have not found cooperative rewards to be superior to individualistic rewards when performance is measured (Hamblin, Hathaway, & Wodarski, 1971; Michaels, 1977; Niehoff & Mesch, 1991). These results may be due to the type of individualistic reward offered to students who work in cooperative groups.

The purpose of the current study was to examine the effect of cooperative learning and type of reward on performance and continuing motivation. The study is a continuation of a program of research designed to investigate how cooperative groups can be implemented with media originally designed for individual learning. While several studies have been conducted to examine cooperative learning and computers, little work has been conducted to examine cooperative learning and instructional television. Adams, Carson, and Hamm (1990) suggest that cooperative learning can influence attention, motivation, and achievement when students use the medium of television. These authors indicate that "cooperative strategies which engage students in examining, comparing, clarifying and evaluating enhance individual experiences" (Adams, Carson, & Hamm, 1990, p. 39).

In this study, subjects used either a cooperative or individual learning strategy while receiving instruction from a television lesson. The independent variables were instructional method (individual versus cooperative) and type of reward (task, performance, none). The dependent variables were performance and continuing motivation.

Method

Subjects

Subjects were 126 undergraduate education majors (30 males, 96 females) in the first semester of a teacher training program at a large southwestern university. All subjects were enrolled

in a required course in educational psychology; participation in the study fulfilled a requirement for this course.

Materials

Materials used in this study were an instructional television lesson, a posttest, and a continuing motivation survey.

The instructional television lesson was from the series Instructional Theory: A nine unit mini-course (Gerlach, 1973). The lesson included a videotape and a workbook that provided instruction on the topic of objectives-based assessment. The videotape was approximately 30 minutes in length. It was divided into seven segments which presented information and examples on the content of the lesson. After each segment, the videotape instructed subjects to turn to their workbook for practice and feedback on the content presented in that segment. For example, Segment 4 provided instruction on the use of paper-and-pencil tests, interviews, and observations of student performance or product. After providing information and examples of these three types of objectives-based assessment, the tape presented viewers with three instructors who wished to evaluate a student's work of sculpture. The videotape directed subjects to "Turn to Exercise 4 in your workbook" where they were asked to "Describe the best type of objectives-based assessment for this situation." The workbook then provided written feedback to this practice item on the following page.

Performance was measured using a 15-item, constructed response posttest. The items were developed to evaluate student mastery of the instructional objectives for the lesson on objectives-based assessment. The following is an example of an item on the posttest:

> An industrial technology instructor is teaching his students to adjust a communications receiver so that the sound is of certain minimum quality, at the very least. How should he test for the attainment of this objective?

The maximum score on the posttest was twenty points. Individual answers were checked against a scoring key and points were assigned for each answer. Partial credit was given for questions that required a multiple response such as "List three types of objectives-based assessment." One person scored all of the items on this test. The Kuder-Richardson internal-consistency reliability of the posttest ranges from .69 to .81 (Klein & Pridemore, 1992).

Continuing motivation was assessed using a paper and pencil survey. This survey consisted of seven items that measured the degree to which a subject would want to return to tasks like those used in the study. The directions on this survey indicated,

> Some of the things that you will be learning in the teacher training program will be taught using activities similar to those used in the lesson on objectives-based assessment.

We are interested in the kinds of activities that you would like to participate in as you continue in the program.

A five-point Likert scale was used to indicate agreement with the statements:

(1) I would like to learn more about objectives-based assessment;

(2) I would like to learn more about objectives-based assessment using instructional television;

(3) I would like to learn more about other topics using instructional television;

(4) I would like to use instructional television programs that require me to work with other students;

(5) I would like to use instructional television programs that require me to work by myself;

(6) I would like to participate in other activities that require me to work with other students;

(7) I would like to participate in other activities that require me to work alone.

The Cronbach alpha internal-consistency reliability estimate of this survey was .60.

Procedures

Subjects were randomly assigned to one of six treatment conditions. All possible combinations of instructional method (individual versus cooperative) and type of reward (task, performance, none) were equally represented after assignment to groups. Additional random assignment was conducted for the

cooperative learning treatments; subjects in these conditions were randomly assigned to groups of three (triads).

Each treatment condition was implemented in a separate room; each room had more than one individual or cooperative group present at a time. At the beginning of the lesson, subjects in all treatments were informed that they would be viewing an instructional television program on objectives-based assessment and that they would be using a workbook to receive practice and feedback on the content of the lesson. Subjects were told to write the answer to each practice exercise in the workbook and read the feedback that followed each exercise. In addition, subjects in all groups were directed to read the first two pages of the workbook to receive the lesson objectives and were told that they would each be completing a test on the content of the lesson. Other procedures and directions were different depending on treatment condition.

Subjects received specific directions for implementing either an individual or a cooperative learning strategy. Subjects working alone were each given a workbook, instructed to work independently during the lesson, and told to do their best work. Subjects in the cooperative learning conditions were randomly assigned to a triad. Each triad was given a workbook and told to (a) work together during the lesson, (b) discuss all practice exercises and any disagreements over the answers, and (c) discuss the given feedback.

Subjects also received specific directions concerning the reward for learning depending on their treatment group. Subjects in the task reward groups were told, "Your participation in this lesson is worth ten points toward your course grade." Subjects in the performance reward groups were told, "Your participation in this lesson can be worth as much as ten points, but the number of points you earn depends on how much you learn from the lesson." Finally, subjects in the no reward groups were told, "Your participation in this lesson will help you to be successful both on the final exam and on the course project."

After the above instructions were provided, the videotape was started for each treatment condition. When Segment 1 was completed, the tape was stopped and subjects did Exercise 1. When Exercise 1 was completed, the videotape was started again. This cycle was continued until all seven sections of the lesson were finished.

Upon completion of these activities, all workbooks were collected and each subject individually completed the continuing motivation survey. One week later, all subjects were given the posttest and were required to work individually to complete it. One week after the posttest session, subjects attended a debriefing session where they were informed that each of them would earn ten points toward their course grade regardless of how well they performed on the lesson posttest.

Design and Data Analysis

A 2 X 3 factorial design was used, with instructional method (individual versus cooperative) and type of reward (task, performance, none) as the independent variables. The dependent variables were performance and continuing motivation. Analysis of variance (ANOVA) was used to test for a difference between groups on the posttest. Multiple analysis of variance (MANOVA) was used to test for an overall difference between groups on the continuing motivation survey. This analysis was followed by univariate analyses on the individual survey items. Alpha was set at .05 for all statistical tests. Effect size estimates (ES) expressed as a function of the overall standard deviation were also calculated. Data for 125 out of the 126 subjects were included in the analyses, since data for one subject was incomplete.

Results

Performance

Performance was measured using the 15-item, constructed response posttest. Mean scores and standard deviations for the posttest can be found in Table 1.

Table 1 about here

Analysis of variance (ANOVA) revealed that type of instructional method had a significant effect on performance, $F(1, 119) = 4.07$, $p < .05$, $MSe = 13.76$, $ES = .34$. Subjects who

worked alone performed better on the posttest (M = 11.9, SD = 3.7) than those who worked cooperatively (M = 10.6, SD = 3.6). Type of reward did not have a significant effect on performance. Furthermore, a significant interaction between instructional method and type of reward was not found.

Continuing Motivation

Continuing motivation was measured using the seven-item scale. Mean scores and standard deviations for individual continuing motivation items can be found in Table 2.

Table 2 about here

Multiple analysis of variance (MANOVA) suggested that type of instructional method had a significant effect on continuing motivation, $F(7, 113) = 4.10$, $p < .001$. Type of reward did not affect continuing motivation and a significant interaction between instructional method and type of reward was not found.

Univariate analyses revealed that subjects who worked alone expressed more continuing motivation than those who worked cooperatively for instructional television programs that require individual work, $F(1,119) = 16.23$, $p < .001$, $MSe = 1.34$, $ES = .69$, and for other activities that require individual work, $F(1,119) = 7.50$, $p < .01$, $MSe = 1.44$, $ES = .48$. In addition, subjects who worked cooperatively expressed more continuing motivation than those who worked alone for activities that

require working with other students, $F(1,119) = 5.82$, $p < .05$, $MSe = .94$, $ES = .42$.

Discussion

The purpose of this study was to explore the effect of cooperative learning and type of reward on performance and continuing motivation. Subjects used either a cooperative or individual learning strategy while receiving information, examples, practice, and feedback from an instructional television lesson.

Results indicated that subjects who worked alone performed better and expressed more continuing motivation than those who worked cooperatively. These findings lend support to other studies which suggest that a cooperative strategy may not affect educational outcomes in some settings. While cooperative learning has influenced student performance and attitudes in classroom settings (Johnson & Johnson, 1989; Sharan, 1980; Slavin, 1990), cooperative learning has not always influenced performance when it is implemented with media originally designed for individual learning (Carrier & Sales, 1987; Klein & Pridemore, 1992).

The results of the current study may have occurred because of how students approach learning from instructional television lessons. In our society, television viewing is an individual experience with little opportunity for interaction among viewers. Furthermore, television is typically implemented for individual

use in instruction. Most students have very little practice working with other people when using instructional television lessons.

Even though subjects in the triads were given specific directions for implementing a cooperative strategy during the lesson, informal observations suggest that many groups did not follow these directions. After each segment of the tape was stopped, subjects in several of the triads quietly read the question in the workbook to themselves. One of the group members would usually ask the others for the answer and would write it in the workbook. Very little on-task discussion occurred in these groups. Groups that finished the practice before other triads in the room would usually talk about topics that were unrelated to the lesson. These behaviors are somewhat different than those of the subjects who worked alone. After reading the each question and answering it, many individuals who finished the practice before others in the room usually reviewed the item or looked ahead to the next item in their workbook. This additional on-task behavior may have enhanced the performance of subjects who worked by themselves.

Another explanation for the results found in this study may be due to the nature of the reward structure provided. Subjects in both the cooperative and individual learning conditions were placed in one of three individual reward structures (i.e.: task, performance, none). Even subjects in the no reward conditions had some incentive for individual learning, because they were

told that the lesson would increase success in the course. None of the subjects in the cooperative groups were placed in a cooperative reward structure. Slavin's (1991), suggestion that group rewards have a strong impact on cooperative learning in classroom settings may also be legitimate when cooperative groups use media that were originally designed for individual learning.

This study has some implications for those who design instruction. Educators should implement specific instructional elements (e.g., practice, feedback, review) when they present information via television lessons. Each student should be given the opportunity to receive these elements during a televised lesson. Furthermore, practitioners who wish to employ cooperative learning strategies with media such as CAI or television should provide each group an opportunity to practice working with others before assessing their performance. Finally, educators should provide appropriate rewards to promote group interaction and on-task behavior in all cooperative learning settings.

Future research should continue to explore the use of cooperative learning with technologies that were originally developed for individual learning. Studies should investigate how different reward structures (e.g., individual, cooperative, competitive) influence outcomes in educational technology settings. Research should also be conducted to examine how students can be taught to cooperate together when they use media. These studies should examine the quantity and quality of group

interaction when cooperative strategies are implemented with media. These suggestions will assist us in determining the appropriate use of cooperative learning.

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Table 1

Mean Scores and Standard Deviations on Performance Test

Condition	Type of Reward			
	Task	Performance	None	Total
Individual Learning	11.5	11.6	12.5	11.9
	(3.2)	(3.9)	(4.2)	(3.7)
Cooperative Learning	9.9	11.6	10.0	10.6
	(3.0)	(3.8)	(3.9)	(3.6)
Total	10.7	11.6	11.3	11.2
	(3.2)	(3.8)	(4.2)	(3.8)

Note: Maximum possible score = 20;

Table 2

Mean Scores and Standard Deviations for Continuing Motivation

	Group		
Item*	Individual	Cooperative	Total
Question 1	3.99	3.73	3.86
	(0.86)	(1.07)	(0.98)
Question 2	2.61	2.29	2.45
	(1.18)	(1.11)	(1.15)
Question 3	2.79	2.43	2.61
	(1.18)	(1.17)	(1.18)
Question 4	2.61	2.95	2.78
	(1.21)	(1.40)	(1.31)
Question 5	2.69	1.86	2.27
	(1.28)	(1.00)	(1.21)
Question 6	3.60	4.02	3.81
	(1.06)	(0.87)	(0.99)
Question 7	3.16	2.57	2.86
	(1.19)	(1.19)	(1.22)

*Specific item description are found in text.